

[Dr. Charles T. Jackson's Statement of the History of his discovery of the means of preventing all sensations of pain in Surgical operations, by administration of Vapor of pure Sulphuric Ether mixed with air, by pulmonary inhalation.]

BOSTON, December 18, 1851.

Hon. Wm. H. BISSELL, Chairman of a Select Committee on the Ether discovery, &c.—

SIR: I have the honor of laying before you a brief account of the origin of the discovery of the anæsthetic effects of pure sulphuric ether vapor mixed with air. This paper is the original rough copy of the memorial I have sent to his Excellency Baron Alex. Von Humboldt, of Berlin, to lay before the Royal Academy of Berlin, and was prepared by request of the Hon. Secretary of State of the United States "for Baron Humboldt's use," and was transmitted by me to the Department of State. I trust you will find in it and in the evidence I shall have the honor to send to you, to lay before your committee, ample proofs, that the discovery of etherization arose with me, and was introduced into surgical practice under my directions. Any points not perfectly clear to you, I shall be happy to write to you about, and give you any and all the information I possess concerning this discovery.

I regret that the very short notice you gave me of your having the subject of this discovery before your committee, will not allow me to make a transcript of the original paper, and therefore I beg you will allow me to present it in my own hand-writing, which is not quite so good as that of an expert penman, but I trust will be found clear and legible enough for the printers to set up, in case the documents are printed for information of Congress.

While I was a student in medicine, in 1825, '26, '27 and '28, I was engaged in chemical and physiological researches connected with my professional studies, and had read with deep interest the curious researches of the late Sir H. Davy, on the physiological effects of various gases, when inhaled into the lungs, and I repeated all those that were not considered imminently dangerous, for the purpose of realizing their effects on the system.

Among the other gases I inhaled very frequently, and administered to others, the protoxide of nitrogen, (exhilarating gas,) and was thus made perfectly familiar with its physiological effects. Subsequently I thought much of Davy's suggestion, that protoxide of nitrogen might possibly be employed in mitigating the pain of a surgical operation, and on my return from Europe, where I had been to improve myself in the sciences of medicine and surgery, I determined to try the effects of that gas in every possible way, and I did, in 1837, <sup>think that I had produced</sup> the state of insensibility required, by administering to several young men the protoxide of nitrogen, through a very small aperture, closing the nostrils at the time, so as to exclude air from the lungs, but I found that I only had produced a partial and a dangerous state of *asphyxia*, and that the patients had not lost sensation, as was proved by pulling their hair, and by touching them. I came to the conclusion, therefore, that anæsthesia, or insensibility to pain, can not be produced by the inhalation of that gas, as proposed by Sir H. Davy, and therefore abandoned that method.

Having been appointed Geologist and Chemist to the State of Maine, in 1836, I opened a large chemical laboratory the next year, for instructing my pupils, and for making the chemical analyses for the State, and had frequent occasion to experiment with chlorine gas, and had accidents myself, as with my pupils, by the breakage of vessels filled with this gas, and had inhaled it into the lungs. Vapor of alcohol was at that time the remedy we used for relief, and not finding it to answer the purpose satisfactorily, I soon after tried the inhalation of sulphuric ether vapor, which from 1837 to 1851, was the means in habitual use in my laboratory for relieving persons from the effects of the action of chlorine in the lungs. It will be seen by the deposition of Dr. Wm. F. Channing, that I administered it to him in 1846, in the month of March. [Vide Dr. Martin Gay's statement—testimony, p. 5.] This was after I had discovered its power of paralyzing the nerves of sensation, as also appears in his deposition, and in those of John H. Blake, Esq., and Dr. George T. Dexter and D. J. Brown's letters, the deposition of Henry D. Fowle and Dr. S. A. Bemis. In the winter of 1841-2, I made the discovery of anaesthesia by ether vapor, as is proved by the depositions above referred to.

The history of this discovery is deemed interesting to the scientific world, and I shall therefore give the facts and my induction in detail. The origin of the discovery, you will perceive, was from an accident, but the *induction*, by which the *discovery* itself was made, was truly scientific and legitimate in all respects. The circumstances were as follows:—In the winter of 1841-2, I was employed to give a few lectures before the Mechanics Charitable Association, in Boston, and in my last lecture, which I think was in the month of February, I had occasion to show a number of experiment in illustrations of the theory of volcanic eruptions, and from my experiments I prepared a large quantity of chlorine gas, collecting it in gallon glass jars over boiling water. Just as one of these large jars was filled with the pure chlorine, it overturned and broke, and in my endeavors to save the vessel I accidentally got my lungs full of chlorine gas which nearly suffocated me, so that my life was in imminent danger. I immediately had ether and ammonia brought to me, and alternately inhaled them with great relief. The next morning my throat was severely inflamed, and very painful, and I perceived a distinct flavor of chlorine in my breath, and my lungs were still much oppressed. I determined, therefore, to make a thorough trial of the ether vapor, and for that purpose went into my laboratory, which adjoins my house in Somerset street, and made the experiment from which the discovery of anaesthesia was induced.

I had a large supply of perfectly pure washed sulphuric ether, which was prepared in the laboratory of my friend, Mr. John H. Blake, of Boston. I took a bottle of that ether, and a folded towel, and seating myself in a rocking chair, and placing my feet in another chair, so as to secure a fixed position, as I reclined backward in the one in which I was seated. Soaking the towel in the ether, I placed it over my nose and mouth, so as to inhale the ether mixed with the air, and began to inhale the vapor deeply into my lungs. At first the ether made me cough, but soon that irritability ceased, and I noticed a sense of coolness, followed by warmth, fulness of the head and chest, with giddiness and ex-

hilaration. Numbness of the feet and legs followed, a swimming or floating sensation, as if afloat in the air. This was accompanied with entire *loss of feeling*, even of contact with the chair in which I was seated. I noticed that all *pain had ceased in my throat*, and the sensations which I had were of the most agreeable kind. Much pleased and excited, I continued the inhalation of the ether vapor, and soon fell into a dreamy state, and then became unconscious of all surrounding things. I know not how long I remained in that state, but suppose that it could not be less than a quarter of an hour, *judging from the degree of dryness of the cloth*, which during this state of unconsciousness, had fallen from my mouth and nose and lay upon my breast. As I became conscious I observed still there was no feeling of pain in my throat, and my limbs were still deeply benumbed, as if *the nerves of sensation were fully paralyzed*. A strange thrilling now began to be felt along the spine, but it was not in any way disagreeable. Little by little, sensation began to manifest itself; first, in the throat and body, and gradually extended to the extremities, but it was some time before full sensation returned, and my throat became really painful. Reflecting upon these phenomena, the idea flashed into my mind, that *I had made the discovery I had for so long a time been in quest of*—a means of rendering the nerves of sensation temporarily insensible to pain, so as to admit of the performance of a surgical operation on an individual without his suffering pain therefrom. *That I did draw this inference, and did fully declare my unqualified belief in both the safety and efficiency of this method of destroying all sensation of pain in the human body during the most severe surgical operations, no one doubts, and it is fully proved by abundant legal evidence which has never been impeached or doubted in any quarter.*

I beg leave to refer you again to the evidence of Dr. Wm. F. Channing, a man of science, Fellow of the American Academy of Arts and Sciences, son of the late Dr. Wm. E. Channing, our most eminent divine. To the testimony of Dr. S. A. Bemis, one of our most eminent dentists. To the letter of Mr. John H. Blake, a distinguished chemist, and to the testimony of Mr. Henry D. Fowle, one of the best and most faithful apothecaries of Boston, and to the letters of Dr. Geo. T. Dexter, of New York, and of D. Jay Brown, of New York, obtained since this paper was written. Their evidence, with that of my worthy friend and former pupil, Mr. Joseph Peabody, *élève ingénieur à l'école des mines*, at Paris, prove that I had made this discovery, and long before any other person had even tried a single experiment of the kind. [See, also, the new and very important evidence of Dr. Geo. T. Dexter, of New York, and that of Mr. D. J. Brown.]

In the rapid inductions of the mind, it is not always easy to trace the exact method of thought by which we suddenly arrive at great truths; but so far as I can trace the reasonings that rapidly flowed through my mind, it was based upon principles well understood by all educated physicians and physiologists. I knew that the nerves of sensation were distinct from those of motion, and of organic life, and that one system might be paralyzed without necessarily and immediately affecting the others. I had seen often enough in my medical practice, the nerves of sensation paralyzed without those of motion being affected and those

of sensation being influenced, and both the nerves of motion and sensation paralyzed without the ganglionic nerves, or those of organic life being affected. I knew, also, that the nerves of sensation are stationed as sentinels near the exterior of our bodies, to warn us of danger from external causes of injury, and that there is no feeling in the internal portions of our bodies. I knew, also, that when the knife is applied in surgical operations, that there is little sense of pain in any parts beneath the skin. This, my own surgical experience, as well as that of others, had long ago demonstrated, and the philosophy of these physiological facts was made known to the medical world in England and in this country, by the researches of Sir Charles Bell, of England, and was fully proved by all the eminent anatomists and physiologists in Europe.

Now, I had observed, 1st. That the nerves of sensation in my own body were rendered *insensible to pain* for some time before unconsciousness took place.

2d. That all pain had ceased in a suffering part of my body during the stages of etherization preceding and following the unconscious state.

3d. That this state of insensibility of the nerves of sensation continued for a sufficient length of time to admit of most surgical operations, and I had reason to believe that during the unconscious period the degree of insensibility was still greater, so that it would be impossible that any pain could be felt in a surgical operation.

4th. That the nerves of motion and of the involuntary functions of respiration and of circulation were in no wise affected; the functions of life going on as usual, while the nerves of sensation were rendered devoid of feeling, and the body could suffer no pain. By long experience in the trial of ether vapor in spasmodic asthma, and from numerous carefully conducted physiological experiments, I had learned that the vapor of ether could be safely inhaled into the lungs to an extent before believed to be highly dangerous. [Beck's Med. Jurisp.] That *I did first discover that the nerves of sensation could be, and were paralyzed to all sensation temporarily and safely by the inhalation of ether vapor, is admitted by all scientific men who have examined the evidence.* That *I did first prescribe its administration for the purpose of preventing all sensation of pain in surgical operations, with the guarantee on my medical and scientific responsibility of its entire safety, if my directions were strictly observed, and did thus introduce the use of pure sulphuric ether vapor mixed with air into surgical practice is fully proved by abundant testimony, and is admitted by all persons who have examined the evidence that I have caused to be printed.*

The only point contested by my opponents is, that in *their opinion I had not sufficient reason for drawing the inference that I did, as they admit, draw from my data,* and that I could not have "*known*" the full extent of the insensibility to pain of a surgical operation, and that this remained to be verified by actual trial. Now, it appears to me clear enough, that when I had discovered that the nerves of sensation were paralyzed, that I did *know* that the body could feel no pain, and that my induction was the most natural thing in the progress of reasoning from my well ascertained data. To the ignorant, it is easy to appeal by allegations like these, of my very unscientific opponents, that "Dr. Jackson

could not have known," anterior to the verification experiments performed at the hospital, that the patient was wholly insensible to pain, when under the influence of ether; but no scientific physiologist or physician can possibly entertain a doubt of the sufficiency of my evidence that the body could feel no pain when the *nerves of sensation were rendered insensible*. Again, it is claimed by my opponents, that by inducing an ignorant dentist, a man of no medical knowledge, to perform the mere mechanical operations, under my advice, and my medical responsibility expressly assumed before witnesses, that I made him a copartner or joint discoverer, and that *he* made the first application of my discovery. Now, I respectfully dissent from this opinion, and in my dissent I am sustained by the highest scientific medical and legal authorities of this country, and by the most eminent men of science, of Europe, who have considered this question. I claim that I not only *discovered the principle*, but also by my advice and prescription as above stated, *made the application*, in the highest sense of the term. This is also the opinion of Hon. Edmund Burke, late Commissioner of Patents, and of Charles G. Loring, Esq., one of the most eminent counsellors at law in this city; and such is the opinion of every man of science whom I have consulted. The Massachusetts Medical Society, at their annual meeting in 1849, confirmed this decision by *general acclamation*. Hon. Edward Everett, late Minister Plenipotentiary to the Court of St. James, is of similar opinion, which is sustained in England by Professor William Whewell, D.D., of Cambridge College, Sir Charles Lyell, the distinguished Geologist, Sir Robert Inglis, President of the British Association for the Advancement of Science, and by Professor L. Elie DeBeaumont, the distinguished Geologist of France, and by all the decrees of the Institute of France, in similar cases. Professor William Gibson, of Philadelphia, who was cognizant of the whole history of the discovery of etherization, and who introduced its administration in surgical operations, by my directions, in Philadelphia, in his public lectures and in his printed letters fully accords to me the discovery of the principle and its application in surgery.

The errors into which some of the persons connected with the Massachusetts General Hospital have plunged, appears to have been due, in part, to a too narrow view of the *nature of a scientific discovery*. They seem to have mistaken the *nurse* for the *physician*. The few medical gentlemen or young surgeons of the hospital who have not fully recognized my rights in this discovery, are, I lament to say it, anxious to obtain a larger share of the glory than rightly belongs to them; and one of them, a very conceited young surgeon, Dr. H. J. Bigelow, very distinctly claims the honor of being the first to promulgate this great discovery—"the first to make the profession acquainted with it!"—he having stealthily published my discovery before I was ready to lay it before the public, and while I was temporarily absent from the city, by reading an account of it before two societies, of which I was and am a member, —the Boston Society for Medical Improvement, and the American Academy of Arts and Sciences, of Boston,—and afterwards published his paper in the Boston Medical and Surgical Journal, against my solemn protest, and denunciation of it as *false, unjust, and quackish*. In that paper, a copy of the Journal containing which I send to you, please

observe that the nature of the "agent" used is carefully concealed, and hence it is a mere *quack advertisement*.

Mr. N. I. Bowditch has, unauthorized and against the protest of some of the trustees of the Massachusetts General Hospital, caused to be printed an *ex parte* statement in favor of the claims of the quack dentist whom I allowed to use my method of preventing pain in surgical operations. He is a man of no science, of no knowledge of physiology or of medicine, —a mere conveyancer of real estate—a man wholly incapable of any scientific examination of this question, and a man of most bitter prejudices against me, personally, exceeding in dogged obstinacy any man I ever knew or have ever heard of. Convicted of error, he still insists that he is right, and he has been known to set up his opinion against the judges of our Supreme Court, and was only silenced by threats of prosecution for slander. [Statement of Lucius Manlius Sargent, Esq., of Boston.]

Such have been my opponents in this country. I name them, not because I have any fears of your attaching any importance to their opinion, or that any scientific man would think their views worthy of consideration, but for the purpose of informing you of the fact that my claims to this discovery have been disputed only by *incompetent persons* whose opinions you will, of course, throw aside as worthless.

It has often been asked, how I happened to commit the execution of my early verification experiments to an ignorant, and wholly uneducated person, like the quack doctor, Morton. This I will now explain. I was not aware of the *infamous character* of that man when he came to solicit the privilege of entering his name at my office as a medical student, and I allowed him to call himself my pupil, and I advised him to attend the lectures at the Medical College, of this city, and endeavored to instruct him in the first principles of human anatomy. I soon found that he was *too ignorant to be capable of learning the medical profession*, though I thought in the course of time he might learn enough to become a surgeon dentist. He was a well dressed and plausible man, and although I knew him to be an *ignoramus* in all matters of science, I thought he could perform the very simple operations that I was about to commit to him, namely, the administration of ether to some of the patients whose teeth he was about to extract. His office, I knew, was frequented by the lower and credulous class of people, such as were attracted by his quack advertisements, with which he filled our daily newspapers. I had for years ceased to practice medicine and surgery, and had no opportunity of operating in any case; my business having for some years become that of a chemist and geologist. I therefore, on the 30th day of September, 1846, induced this dentist, Morton, to *test my discovery* on a person whose teeth he was about to extract, committing it to him in the presence of two of my pupils, Mr. George Orville Barnes, and Mr. James McIntyre, whose sworn depositions are forwarded to you with the other testimony. Mr. Morton, at the time I communicated to him my discovery, was wholly ignorant of the nature of ether, as is fully proved by the testimony above mentioned. He did not come to my office to ask any questions about ether, and did not mention it until after I had communicated to him my discovery. He came only for the purpose of borrowing an India-rubber cloth gas-bag, which he intended to fill with air and pretend it was protoxide of ni-

frogen, which Mr. Horace Wells had been exhibiting in this city, in 1844, but *without any success* in his attempts to prevent pain in extracting teeth. Mr. Morton wished to *impose upon one of his patients*, or to operate upon the *imagination*. He was going out of my office with the bag, when it suddenly occurred to me that I could induce him to test my method by etherization. I therefore, just as he was going out of the office, went to him and took the gas-bag out of his hands, and leading him into my laboratory, in presence of Mr. George O. Barnes, and Mr. James McIntyre, I told him of my discovery of a means of preventing all sensations of pain in surgical operations, by the administration of the vapor of pure sulphuric ether, (oxide of ethyle,) mixed with air. He was evidently astonished at what I told him, and was so much surprised that he ran first to one of my students and then to the other, asking them if the ether "would work" as I said it would. He asked if it was "*a gas!!!*" If I "had any of it," &c. I told him it was a liquid, and took down from my shelf in the laboratory, the bottle half full of ether, and let him smell of it. He then asked me how I used it, and I showed him how to administer it, on a handkerchief. Morton's words were, when I told him the patient could be rendered perfectly unconscious and free from all sensation of pain, by ether,—"*Will it do it? Are you sure?*" and he appeared to be greatly delighted and *danced about the laboratory-room*, when I replied, "*Yes, I know it.*" He then asked me to let him take the bottle of ether which I had just shown him; but since it had been standing in the laboratory for some years, I feared it might have become deteriorated; I therefore advised him to go to Mr. Burnett, one of our best apothecaries, and get some recently prepared pure sulphuric ether. Mr. Morton asked me if there was danger in breathing the ether. I said, *No; there is no danger if you follow my directions.* I then repeated my directions, with all the requisite precautions—told him exactly the effects of the ether upon the patient, and endeavored to persuade him to try it on his own person. He promised to try it, but there is no reason to believe that he ever did, himself, inhale it, so as to produce insensibility to pain, or unconsciousness. He did, however, administer it to Eben Frost, a laborer, and extracted a tooth from his jaw; and the next morning he came to my laboratory and reported the result. Said that it worked exactly as I said it would. "*The patient went right to sleep;*" and he "*pulled his tooth without his knowing anything about it.*" I expressed no surprise, but regarded the result as a matter of course, to be expected from the full etherization of the patient.

I then proposed to have it *further tested* at the Massachusetts General Hospital, by a more severe operation, before publishing my results; but Mr. Morton wished that I should *conceal the discovery* and *let him have the use of it.* *This I declined doing*, saying that I should communicate it to my medical friends, and when ready should publish it. At my urgent request, a few days after, Morton went to Dr. Warren and asked him to let him administer the "*GAS*" to one of his surgical patients, and it was allowed; but the experiment was not satisfactory. It was tried again with better results in another case—a fatty tumor of the shoulder being extirpated. I then saw Dr. Warren at his own house, told him that *Mr. Morton was operating under my directions, and I then engaged*

*Dr. Warren to allow the ether to be administered to a person who was about to undergo a capital operation, (amputation.)* Dr. Warren consented to have the trial made, but said, "I wish you would come and administer the ether yourself; I do not like to have such a quackish fellow as Morton about the hospital."

Learning that the operation was to be performed at the end of the week, and having engagements at a mine in Liberty, Md., I told Dr. Warren that I should be absent, and asked him to *allow Morton, whom I had fully instructed, to administer the ether* in the proposed case. The next morning, I received a note from Dr. Warren, asking about the *nature of the agent used*, and requesting me to procure apparatus for its administration, for the hospital. I was, however, obliged by an appointment I could not break, to go to Baltimore that very day, and was absent from Boston at the time of the operation, which was performed by Dr. George Hayward, on the thigh. Soon as I returned, I accompanied Dr. Warren, and his son John M. Warren, to the Bromfield House, where the ether was successfully administered, and a large tumor was excised from the thigh of a man, who was rendered profoundly unconscious by means of ether vapor inhaled from a glass globe, into which it was admitted by the tubulaire.

It is obvious enough to those who know the circumstances, why I engaged an ignorant man to introduce my discovery. I had already, before Mr. Morton came to Boston and set up as a dentist, endeavored to engage more responsible persons to make the trial of the ether in their practice; but they declined doing so, knowing that the medical and toxicological books declared it to be a *dangerous experiment*, while *I insisted that it was not dangerous*. They thought that in their medical capacity they would incur responsibility for any accidents that might happen to their patient, and hence feared to act. I knew that Mr. Morton placed such implicit reliance upon my scientific and medical skill, as to be willing to perform, *upon my medical responsibility*, any experiment, the safety of which I guaranteed; and he was, therefore, easily persuaded by me to make the trial which I requested, I taking the whole responsibility, before two witnesses, Messrs. Barnes and McIntyre. Again, I knew that he could only be held responsible for the faithful performance of the experiments repeated in the presence of the above-named witnesses. I did not even suspect the possibility of his setting up claims to the discovery, himself, for the idea was too preposterous to have entered the mind of any honest man of science. *I was not then aware of his previous career of infamy*, and knew him only as an ignorant, but enterprising dentist, who had an extensive practice among the lower classes of society, and a reputation among them for *extracting teeth*. When I learned that he had betrayed my trust, and was offering for sale, for large sums of money, the "secret" of my discovery, I called upon him and severely reprimanded him. He then denied that he had ever done any such thing, or had ever thought of claiming the discovery, and said he had never consulted any solicitor about taking out letters patent for it. He most emphatically denied ever having authorised any one to publish an account of the experiment I had committed to him, and concluded by offering me *five hundred dollars* to give him a quit claim to use the ether in dental surgery. This is ad-

mitted in the pamphlets published by *Morton*, entitled the "Letheon, or who was the Discoverer?" He followed me to the door of his office, and said, "It is understood, then, that you are to charge me five hundred dollars for it." My anger was in a measure appeased by his declarations that he never thought of claiming the discovery, and that he "*had always said that he got it of Dr. Jackson.*" So I consented that he should continue to use the ether in his operations, and went home and charged to Mr. W. T. G. Morton, five hundred dollars, in my account books. *This money was never paid to me, nor shall I ever demand it of him.* It proved that he had *lied* to me; that he had not only consulted a patent solicitor, but had actually formed a *co-partnership* with him; and that patent solicitor was to *manage* matters for Mr. Morton, and receive one-third of the proceeds of the sales of patent rights in the United States, and one-half of that received for patents in Europe. It also is proved, that he did employ a clerk to publish in one of the newspapers of this city, the notice which he had so solemnly denied having authorized to be published. It was such a paper as would have been authorized only by a charlatan, and was strongly denounced by me as such.

Finding that I was in great danger of losing the credit of my discovery, I was foolish enough to listen to the advice of the *patent solicitor*, *Eddy*, whom I did not at the time suspect of being interested with *Morton* in his attempts to rob me of my discovery, and by his pretended friendly advice I allowed my name, under the following protest, to be used in procuring letters patent. This document, I found, was not the one that Mr. Eddy actually sent to the Patent Office, and that discovery led to an investigation, proving that Mr. Eddy was a co-partner with Mr. Morton.

The protest dictated by me, and written in my presence, by Mr. Eddy, was as follows:—

*"Dr. Jackson is extremely unwilling to take out a patent for anything applicable to the relief of human suffering; but in order to secure the honor of this discovery, and to conform to the laws of his country in transmitting his rights to another, hereby consents," &c.*

Under his usual power of attorney, Mr. Eddy altered this as follows, and without my knowing it at the time of signing it. "Dr. Jackson, willing to benefit Mr. W. T. G. Morton, assigns to him his rights to the interest, and requests the Commissioner of Patents to issue the patent in the name of 'W. T. G. Morton,'"—or words to the same effect. Trusting that my injunctions had been faithfully carried out in the papers, I signed them without reading them, and that was the origin of the whole mystery of my name having been associated with that of Mr. Morton in this patent so improperly obtained.

Consulting the Commissioner of Patents, Hon. Edmund Burke, I learned that the patent was only good so far as my name was connected with it, and by his advice I at once appealed to the public—destroyed the bond given me by Mr. Morton, and made the use of ether, in surgical operations, **FREE TO ALL MANKIND**—and free it has been from that day, in spite of all attempts to speculate in human sufferings, for money, as was steadily persevered in by Mr. Morton and his associates. I went before the Massachusetts Medical Society, and voluntarily offered my discovery freely to all medical men.

I communicated it freely to the world, and laid the evidence that it was my own discovery before the Académie des Sciences, of France, by which learned body the award of the discovery was made to me, and the Monthyon prize voted therefor, as appears in the accompanying copy of the letter of M. Flourens, Perpetual Secretary of the Académie des Sciences.

CHARLES T. JACKSON, M. D.

Boston, Mass., Nov. 22d, 1851.

*Chloric Ether and Pure Chloroform.*

In the winter of 1833, I prepared a very strong solution of chloroform in alcohol, following the directions published in the American Journal of Science and the Arts, for 1832, vol. xxii. p. 105, by Samuel Guthrie, Chemist, at Sackett's Harbor, and by A. A. Hayes, Esq., Chemist of the Roxbury Chemical Works. [Am. Jour. Science, for 1832, p. 163.] This kind of chloric ether was used by me, and by other physicians at the time, in cases of asthma; and it was found to be very serviceable in those cases called spasmotic asthma.

In 1834, while engaged in the practice of medicine, employing only my leisure hours in chemical pursuits, I had occasion to try the effects of some of my strong chloric ether in relieving the pain of a carious tooth of a young woman, who was very unwilling to have the tooth extracted. The immediate relief which this remedy gave, and the permanent cure of the toothache in this case, demonstrated a new power in this valuable preparation; and there was an immediate call made upon me to furnish other persons with this preparation. I then tried it on my own teeth, and took a phial of it to Dr. N. C. Keep, and requested him to use it in deadening the pain in an inflamed carious tooth, which he was about to fill or plug for me. He did so, and was greatly pleased with its effects, which were preferable to creosote, then usually employed for the same purpose.

I gave to keep, to Dr. Keep, the phial of strong ether, and he used it successfully in many subsequent operations, at his office. I also prepared phials of it for other dentists of Boston; gave some of it to Dr. Josiah Flagg, an eminent dentist of this city, who also used it with success. I then had so many calls for it that I could not supply the demand, and in order to save myself further trouble, employed Messrs. Furguson and Callender, Chemists of the Norfolk Laboratory, in Roxbury, to manufacture the strong chloric ether for sale, and instructed them how to prepare it of great strength and purity. They made it for several years, and sold it under the name of "*Chlorial*," to distinguish it from ordinary chloric ether of commerce, which is weak and inefficient as an allayer of toothache.

After I had made the discovery of the anaesthetic properties of ether vapor, by inhalation of it mixed with air, I attempted to produce a similar effect by the strong chloric ether, but the experiments did not prove satisfactory, probably on account of the large proportion of strong alcohol in it, and its being administered on a dry cloth. A wet sponge or cloth abstracts the alcohol from chloric ether and leaves only pure chloroform, the water combining with the alcohol.

I did not think it so safe as pure sulphuric ether, and therefore prepared the latter. I included it, however, among the agents that would probably serve as a substitute for sulphuric ether, in my communications subsequently made to Robert H. Eddy, Esq., the Patent Solicitor, and it was inserted in the patent taken out by him in the name of Morton.

In 1847, I learned from the French journals that M. Flourens had employed a mixture of chloroform and sulphuric ether as a substitute for pure sulphuric ether, as an anæsthetic agent; and soon after, that Mr. Waldie, a Scotch chemist, had suggested to Dr. Simpson, that *pure chloroform* would serve as a substitute for the sulphuric ether, which he had been using, pursuant to my published directions.

On the 1st of January, 1848, I published in the Boston Atlas, a very full account of the method of preparing pure chloroform, and gave full and minute instructions to an eminent druggist of this city, Mr. W. B. Little, how to prepare it on a large scale.

I also publicly administered it to a number of persons, to Dr. John C. Warren, and to Mr. Joseph Wightman, at the "Warren Club," and to my pupils in my laboratory, and without any accident of any kind.

I also prepared, and gave away, large quantities of pure chloroform, and of a mixture of chloroform and pure sulphuric ether, which I recommended as preferable to that more powerful and somewhat dangerous agent, chloroform.

On the 1st of October, 1848, I published in a pamphlet edited by Mr. W. B. Little, a more full account of my experiments, and especially of those made at the McLean Asylum for the Insane, by Dr. Luther V. Bell and myself, on previously insane patients, who were greatly relieved by this administration of the mixture of ether and chloroform. No unpleasant accidents ever happened to any of the patients to whom I administered the preparation; and I was generally successful, even in the most desperate cases of insanity, in rendering the patient perfectly insensible and unconscious, which state gave rest to the agitated nervous system, and relieved the patient in a most remarkable manner. I urged the use of this agent in the treatment of intermittent fevers, in which it has since been successfully employed.

Chloroform soon became cheap, and a common article in the druggists' shops, and was used with great carelessness, by uneducated druggists and other unscientific persons, and deaths soon began to alarm our community, from the want of skilful use of this powerful agent.

I was called to administer remedies to persons thrown into dreadful convulsions, of many days continuance, from the improper administrations of pure, or rather *strong*, chloroform, and so frequent was the abuse of this agent, that I was forced to denounce it as an *unsafe substitute* for the ether originally proposed by me as a means for the super-induction of anæsthesia. I allowed its use when diluted with sulphuric ether, and instructed physicians in the mode of preparing the mixture in proper proportions. I have not known of any accident having taken place from the use of the preparation presented by me, and I use it in my own family freely and without fear, in parturition, and in rendering my children insensible to pain while they have to undergo the operation of extraction of teeth.

## Use of Anæsthetic Agents.

Many substitutes have been proposed for sulphuric ether, in surgical operations. Among others, a Norwegian chemist proposed to employ the bi-sulphuret of carbon, which is made by passing vapor of sulphur over ignited charcoal. This preparation was immediately tried by me, *first upon myself*, with the most astonishing rapid production of entire unconsciousness. I then administered it to Mr. George O. Barnes, and to Mr. George J. Dickenson, two of my pupils, who were rendered unconscious in a few moments by this powerful agent; but I quickly discovered this experiment was eminently *dangerous to life*—partial asphyxia taking place, so as to give me much anxiety as to the result. I therefore abandoned its farther use, and denounced it as dangerous to life.

A correspondent having urged me to make the trial of œnanthic ether made from oil of wine, I prepared a quantity of it, and made the experiment of full inhalations of it on my own person, with the most *painful results*. The œnanthic ether producing severe *headache, vertigo, and nausea*, which lasted for several days.

I also read in the French newspapers, that aldehyde would serve as an anæsthetic agent, and I immediately prepared that article, *and tried it on my own person*, with results like those produced by œnanthic ether. These two agents I therefore discarded, as unfit for inhalation.

I made a long series of experiments on the compounds of methyle, the radical of wood naptha, and found but one that would serve as an anæsthetic agent. It is that admixture of chlorine and methyle, analogous to the ter-chloride of formyle, or chloroform, which I found acted like chloroform, and like it was dangerous in its concentrated state, but not so when diluted with sulphuric ether. I therefore sometimes use it so prepared, and no accident has taken place from its use.

Benzole was proposed by Mansfield, I think, as a substitute for chloroform. I have used it on my own person, and found it so irritating to the tonsils, as to forbid further trial. It seems to act much like impure chloroform, but is not so active.

Thus, it will be perceived that I have given every agent, known to myself, or prepared by others, a fair trial, experimenting *first on myself in all cases*, and then on such of my brave pupils as were willing to submit to my experiments.

Thus far, no agent in safety can be compared to my original *pure washed sulphuric ether, inhaled freely, mixed with air*; and I have never heard of a single fatal accident happening from the administration of this agent, *as originally directed by me*.

It is unfortunate for mankind, that pure or concentrated chloroform was ever substituted for sulphuric ether, for all the prejudices against anæsthetic agents in the community arose from the fatal and disagreeable effects produced occasionally by that powerful agent. In the course of time the public will learn to discriminate between two very different substances, and will learn that the clear vapor of chloroform is likely to produce asphyxia, by drowning, if drawn into the lungs without very large dilution with air.

They will learn, also, that *sulphurous acid* often exists in large proportions in these anæsthetic agents; and that great care must be used in

the preparation of them for inhalation, and that they should be thoroughly examined by competent persons, before they are employed in the production of anaesthesia.

*Apparatus used for administering Anæsthetic Agents.*

I originally, in 1842, used a coarse towel, as the best for administration of sulphuric ether by inhalation. I next used a large open-textured serge, and afterwards, some more *showy apparatus being called for*, I directed the use of a large glass globular condensing receiver, with a tubulaire for the free admission of air, and a large orifice for application to the mouth.

On the 2d or 3d of October, 1846, I loaned to Mr. W. T. G. Morton, a large glass flask, with a large bent glass tube, reaching near to the bottom of the flask, and resting at its bent part loosely upon of the neck of the flask, so as to allow the air to be drawn down freely over the bottom and sides of the flask, and up the tube with the dissolved ether vapor; this apparatus being much like that subsequently invented by Mons. Charrier, Surgical Instrument Maker, of Paris.

This apparatus I did not like so well as a cloth or large sponge, and soon advised that its use be discontinued, and the sponge should be resumed. Soon, however, Dr. A. A. Gould proposed to affix Mauré's syringe valves to the condenser globe, proposed by me, and I was surprised to learn that a patent had been secured for that alleged improvement, and that a large quantity of those "glass inhalers," as they were called, were *offered for sale under the patent ! !* The application of valves to the inhaler, was particularly unfortunate, and I advised at once to give up the use of such *dangerous and suffocating instruments*.

One case of *death* from the use of chloroform in an inhaler of this kind, completed the overthrow of their use in physical practice, and they are now generally discarded among judicious surgeons and physicians, and the use of the sponge is resumed.

The cause of asphyxia, so commonly produced in the early administration of ether vapor at the Massachusetts General Hospital, I traced directly to the employment of those valved inhalers. In the weakened state of respiratory action under anaesthetic agents, the valves are not raised in attempts to breathe, and the patient is *drowned* by the pure ether or chloroform vapor. On the removal of the valve by my directions, asphyxia at once ceased to occur at the hospital, and I had no occasion to employ the "oxygen gas to revive the patients," as I was requested to do by one of the eminent surgeons of that institution, for no asphyxia happened after my advice was followed to throw aside the inhalers and use a sponge.

The results of long experience have confirmed the facts that the use of pure washed sulphuric ether, (oxyde of ethyle,) as originally prescribed by me, and administered as I then directed, is the *safest and best method of producing insensibility to the pain of surgical operations and unconsciousness*, but that a mixture of *one-fourth part of pure chloroform gives greater concentration to the power of the anaesthetic agent*.

I have the honor to be your most ob't,

and respectful servant,

CHARLES T. JACKSON, M. D., &c., &c.

